

Claims

1. A method for prescribing the degree to which a web floats about a web transporting roller, the web having an outgassing pressure, the method comprising the step of setting an operational web tension pressure in relation to the web outgassing pressure.
2. The method of claim 1 wherein the web is in a vacuum.
3. The method of claim 1 wherein the operational web tension pressure is less than the web outgassing pressure, the web thereby being substantially prevented from making contact with the web transporting roller.
4. The method of claim 1 wherein the operational web tension pressure is substantially equal to the web outgassing pressure.
5. The method of claim 1 wherein the operational web tension pressure is greater than the web outgassing pressure.
6. The method of claim 1 further comprising the steps of:
monitoring the web outgassing pressure during web transporting roller operation; and
adjusting the operational web tension pressure in relation to the monitored web outgassing pressure.
7. The method of claim 1 wherein the step of setting an operational web tension pressure further comprises the steps of:
computing a web outgassing molecular density;

computing a target web tension pressure based at least in part on the web outgassing molecular density; and

setting the operational web tension pressure in relation to the target web tension pressure.

8. The method of claim 7 wherein the operational web tension pressure is less than the target web tension pressure.
9. The method of claim 7 wherein the operational web tension pressure is substantially equal to the target web tension pressure.
10. The method of claim 7 wherein the operational web tension pressure is greater than the target web tension pressure.
11. The method of claim 7 further comprising steps of:
 - monitoring the web outgassing pressure during web transporting roller operation;
 - recomputing the target web tension pressure in response to the monitored web outgassing pressure; and
 - adjusting the operational web tension pressure in relation to the recomputed target web tension pressure.
12. The method of claim 11 wherein the operational web tension pressure is less than the recomputed target web tension pressure.
13. The method of claim 11 wherein the operational web tension pressure is substantially equal to the recomputed target web tension pressure.
14. The method of claim 11 wherein the operational web tension pressure is greater than the recomputed target web tension pressure.

15. A method for prescribing the degree to which a web floats about at least one web transporting roller, the web having an outgassing pressure, the method comprising the step of selecting a configuration of the at least one web transporting roller based at least in part on an average surface roughness of the at least one web transporting roller.
16. The method of claim 15 wherein the web is in a vacuum.
17. The method of claim 15 wherein the step of selecting a configuration of the at least one web transporting roller further comprises the steps of:
 - computing a preferred web outgassing molecular density based on at least one of web geometry, geometry of the at least one web transporting roller, and a maximum web tension pressure value; and
 - computing the average surface roughness of the at least one web transporting roller based at least in part on the preferred web outgassing molecular density.
18. The method of claim 15 further comprising the step of minimizing the average surface roughness of the at least one web transporting roller.
19. The method of claim 15 further comprising the step of minimizing an average surface roughness of the web.
20. A method for prescribing the degree to which a web floats about at least one web transporting roller, the web having an outgassing pressure, the method comprising the steps of:
 - setting an operational web tension pressure in relation to the web outgassing pressure; and

selecting a configuration of the at least one web transporting roller based at least in part on an average surface roughness of the at least one web transporting roller.

21. A method for selecting a web transporting roller, the web transporting roller having an actual average surface roughness, the method comprising the steps of:

computing a web outgassing molecular density based on at least one of web geometry, web transporting roller geometry, and a maximum web tension pressure;

computing the average surface roughness of the web transporting roller based at least in part on the web outgassing molecular density; and

selecting the web transporting roller based on the actual average surface roughness in relation to the computed average surface roughness.

22. The method of claim 21 wherein the actual average surface roughness is less than the computed average surface roughness.

23. The method of claim 21 wherein the actual average surface roughness is substantially equal to the computed average surface roughness.

24. The method of claim 21 wherein the actual average surface roughness is greater than the computed average surface roughness.

25. An apparatus for adjusting operational tension pressure of a web, comprising:

a web transporting roller;

a pressure sensor responsive to the ambient pressure about the web transporting roller;

a tension sensor responsive to the tension pressure of the web; and

at least one web tensioning roller adjustable in response to an output from the pressure sensor.

26. The apparatus of claim 25 further comprising:

a controller in communication with the pressure sensor and the tension sensor; and

an actuator in communication with the controller and the web tensioning roller, wherein the web tensioning roller is adjustable in response to an output from the actuator.

27. The apparatus of claim 25 further comprising:

logic to compute a web outgassing molecular density;

logic to compute a target web tension pressure based at least in part on the web outgassing molecular density; and

logic to adjust the web tensioning roller in relation to the target web tension pressure.

28. An apparatus for adjusting operational tension pressure of a web, comprising:

means for measuring ambient pressure about a web transporting roller;

means for measuring web tension pressure; and

means for adjusting web tension pressure in response to the measured ambient pressure.

29. The apparatus of claim 28 further comprising:

means for computing a web outgassing molecular density;

means for computing a target web tension pressure based at least in part on the web outgassing molecular density; and

means for adjusting the web tensioning roller in relation to the target web tension pressure.

30. An article of manufacture comprising a program storage medium having computer readable program code embodied therein for prescribing the degree to which a web floats about a web transporting roller, the computer readable program code in the article of manufacture including:

computer readable code for causing a computer to monitor a web outgassing pressure during web transporting roller operation; and

computer readable code for causing a computer to adjust an operational web tension pressure in relation to the monitored web outgassing pressure, so as to prescribe the degree to which a web floats about a web transporting roller.

31. The article of manufacture of claim 30 wherein the program storage medium having computer readable program code embodied therein further comprises:

computer readable code for causing a computer to compute a web outgassing molecular density;

computer readable code for causing a computer to compute a target web tension pressure based at least in part on the web outgassing molecular density; and

computer readable code for causing a computer to set the operational web tension pressure in relation to the target web tension pressure.

32. A program storage medium readable by a computer, tangibly embodying a program of instructions executable by the computer to perform method steps for prescribing the degree to which a web floats about a web transporting roller, the method steps comprising:

monitoring the web outgassing pressure during web transporting roller operation; and

adjusting an operational web tension pressure in relation to the monitored web outgassing pressure, so as to prescribe the degree to which a web floats about a web transporting roller.

33. The program storage medium of claim 32, further comprising a program of instructions executable by the computer to perform method steps for:

computing a web outgassing molecular density;

computing a target web tension pressure based at least in part on the web outgassing molecular density; and

setting the operational web tension pressure in relation to the target web tension pressure.